National Institute of Environmental Health Sciences

Wastewater irrigation and environmental health: Implications for water governance and public policy

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Abstract:

Climate change is a large-scale and emerging environmental risk. It challenges environmental health and the sustainability of global development. Wastewater irrigation can make a sterling contribution to reducing water demand, recycling nutrients, improving soil health and cutting the amount of pollutants discharged into the waterways. However, the resource must be carefully managed to protect the environment and public health. Actions promoting wastewater reuse are every where, yet the frameworks for the protection of human health and the environment are lacking in most developing countries. Global change drivers including climate change, population growth, urbanization, income growth, improvements in living standard, industrialization, and energy intensive lifestyle will all heighten water management challenges. Slowing productivity growth, falling investment in irrigation, loss of biodiversity, risks to public health, environmental health issues such as soil salinity, land degradation, land cover change and water quality issues add an additional layer of complexity. Against this backdrop, the potential for wastewater irrigation and its benefits and risks are examined. These include crop productivity, aquaculture, soil health, groundwater quality, environmental health, public health, infrastructure constraints, social concerns and risks, property values, social equity, and poverty reduction. It is argued that, wastewater reuse and nutrient capture can contribute towards climate change adaptation and mitigation. Benefits such as avoided freshwater pumping and energy savings, fertilizer savings, phosphorous capture and prevention of mineral fertilizer extraction from mines can reduce carbon footprint and earn carbon credits. Wastewater reuse in agriculture reduces the water footprint of food production on the environment; it also entails activities such as higher crop yields and changes in cropping patterns, which also reduce carbon footprint. However, there is a need to better integrate water reuse into core water governance frameworks in order to effectively address the challenges and harness the potential of this vital resource for environmental health protection. The paper also presents a blueprint for future water governance and public policies for the protection of environmental health.

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Resource Description

Communication: ☑

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☑

audience to whom the resource is directed

Policymaker

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Quality, Food/Water Security, Food/Water Security

Food/Water Quality: Chemical, Pathogen

Food/Water Security: Agricultural Productivity

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Co-Benefit/Co–Harm (Adaption/Mitigation):

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact:

specification of health effect or disease related to climate change exposure

Dermatological Effect, Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: General Foodborne/Waterborne Disease

Intervention:

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Children, Elderly, Low Socioeconomic Status

Resource Type:

format or standard characteristic of resource

Review

Timescale:

time period studied

Time Scale Unspecified